A NEW CRETACEOUS CHIMAERID (PISCES: HOLOCEPHALI) FROM SOUTH AUSTRALIA

by J. A. LONG*

Summary

LONG, J. A., (1985) A new Cretaceous chimaerid (Pisces: Holocephali) from South Australia. *Trans. R. Soc. S. Aust.* **109**(2): 49-53, 28 June, 1985.

Edaphodon eyrensis sp. nov. is described from a single left mandibular toothplate from the Aptian Bulldog Shale, west of Bopeechee Siding, northern South Australia. *E. eyrensis* is characterised by an angular oral margin and by the shape and arrangement of the four tritors. Comparisons are made with other Cretaceous and Tertiary chimaerid dentitions.

KEY WORDS: Pisces, Holocephali, Cretaceous, South Australia, new species, *Edaphon eyrensis*, mandibular.

Introduction

The chimaerids reached a peak of diversity during the Mesozoic, and though numerous genera are known from the Jurassic and Cretaceous of North America, U.S.S.R. and Europe (Newton, 1876; Woodward, 1892, 1912; Hussakoff, 1912; Obruchev, 1964) the only ones described from Australia are *Edaphodon sweeti*, *E. mirabilis* and *Ischyodus mortoni* from the Tertiary (Chapman & Pritchard, 1907; Chapman & Cudmore, 1924). The genus *Edaphodon* ranges from Early Cretaceous to Pliocene, with most species being Late Cretaceous in age. The specimen described here was found on the floor of Lake Phibbs, just south of Lake Eyre, and undoubtedly came from outcrops of the nearby Aptian Bulldog Shale (Ludbrook, 1966). It is therefore not only the first record of a fossil chimaerid from the Mesozoic of Australia (and the only chimaerid fossil from South Australia) but also one of the earliest species of *Edaphodon*. Cretaceous chimaerid toothplates are also known from New Zealand but these belong to *Callorhynchus hectori* and *Ischyodus brevirostris* (Newton, 1876).

Systematic Palaeontology

CLASS HOLOCEPHALI

ORDER CHIMAERIDA

SUBORDER CHIMAEROIDEI

FAMILY CHIMAERIDAE

GENUS *EDAPHODON* Buckland, 1838

Type species. *Chimaera mantelli* Buckland 1835, Cretaceous of England (Ward, 1973).

Remarks: The specimen is referred to *Edaphodon* because of its broad symphysial facet which expands in breadth posteriorly, the number and arrangement of its tritors and the absence of a thickening on its outer face (Hussakoff, 1912, p. 202).

Edaphodon eyrensis sp. nov.
FIGS 1, 2, 3f.

1982 A large — toothplate of *Edaphodon* Long, p. 71.
1984 *Edaphodon* sp. Long & Turner, p. 240.

Etymology. After Lake Eyre, near where the specimen was found.

Diagnosis. An *Edaphodon* having a mandibular toothplate twice as long as broad with four tritors: of which the two posterior and the single symphysial ones are large, and the lateral median one is small. Oral margin angular with anterior ends of outer and lateral median tritors forming right angles.

Material. Only one specimen, the holotype SAM P24770, maximum length = 110 mm.

Occurrence. From the floor of the Lake Phibbs approximately 21 km west of southwest from Bopeechee Siding, west of Marree, South Australia. Lower Cretaceous Bulldog Shale (Aptian).

Description. The bone is weathered, with the semidentine of the tritors being chalky. Despite this the overall shape of the toothplate and outline of the tritors are well preserved.

The oral margin of the mandibular toothplate (Figs. 1, 2, 3f) is quite angular as each of the two lateral tritors (outer tritor, OT; lateral median tritor, LMT) form right angles with the bone in between them. Overall the toothplate is rhomboidal with its breadth exactly half the length. The two large tritors in the posterior half (outer tritor, OT; mesial tritor, MT) are each about a quarter as broad as long and in contact for close to half their lengths. The median

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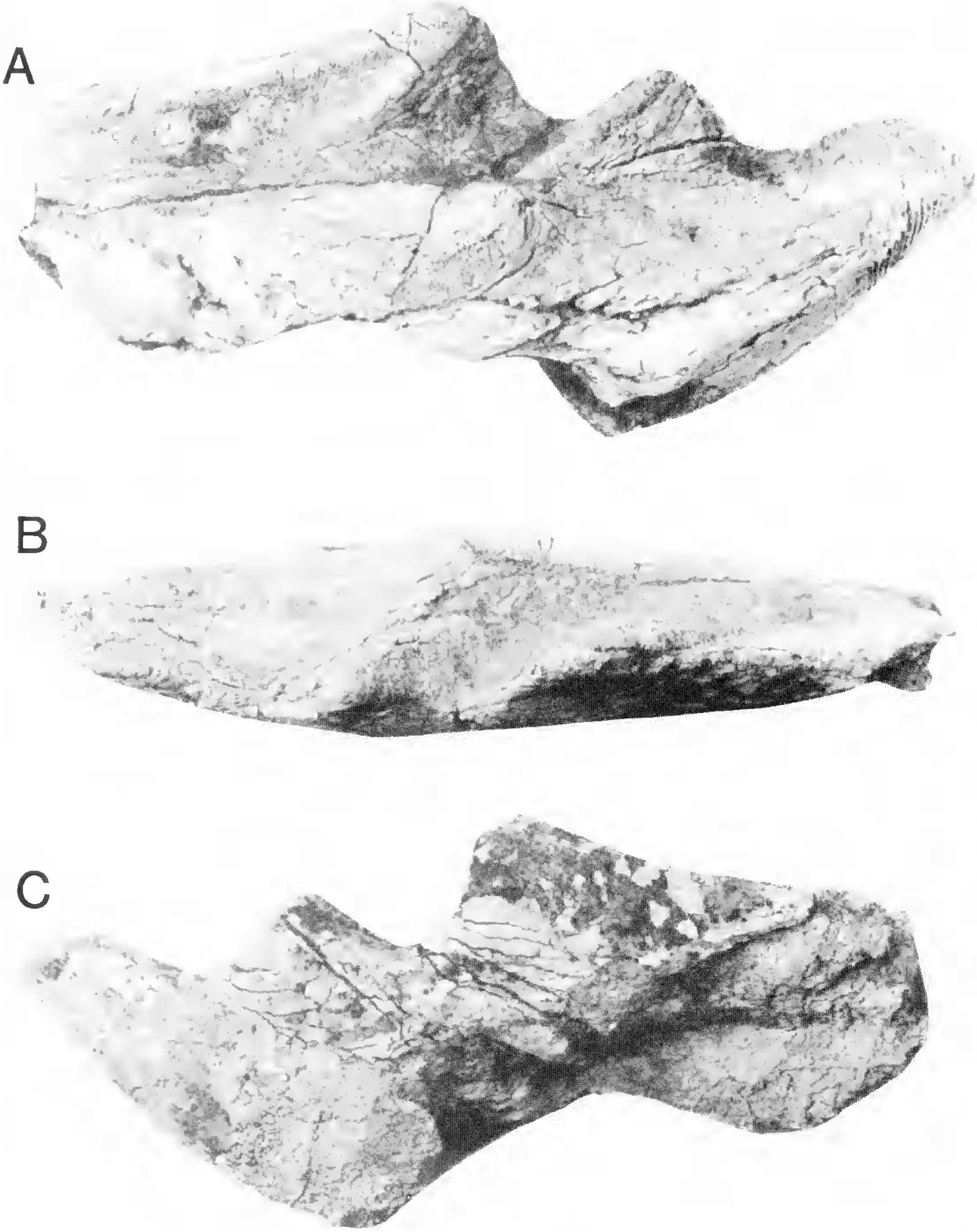

Fig. 1. *Edaphodon eyrensis* sp. nov. Holotype, SAM P24770. Aptian Bulldog Shale, South Australia. A, oral view; B, oral margin; C, aboral view. Natural size.

lateral tritor (LMT) is situated ventral to the mesial tritor and in cross-section is disposed with its long axis at right angles to the mesial tritor. The exposed anterior end of the lateral median tritor narrows to a point. The symphysial tritor (ST) is broader anteriorly than the other tritors, but is relatively thin in cross-section. Although the aboral surface is poorly preserved it is strongly convex anteriorly becoming flatter in the posterior half. The symphysial facet (sf) is broadest posteriorly, with the ventral margin being gently curved.

Discussion

Toothplates of chimaerids show a wide range of shapes and tritorial arrangements which led early workers to confuse various genera and species (Hussakoff, 1912). A series of mandibular toothplates of *Edaphodon mirificus* Leidy, 1856 from the Cretaceous of North America show changes attributable to growth and intraspecific variation. With increasing age the mandibular beak becomes broader and the median lateral tritor becomes more posteriorly situated (Hussakoff,

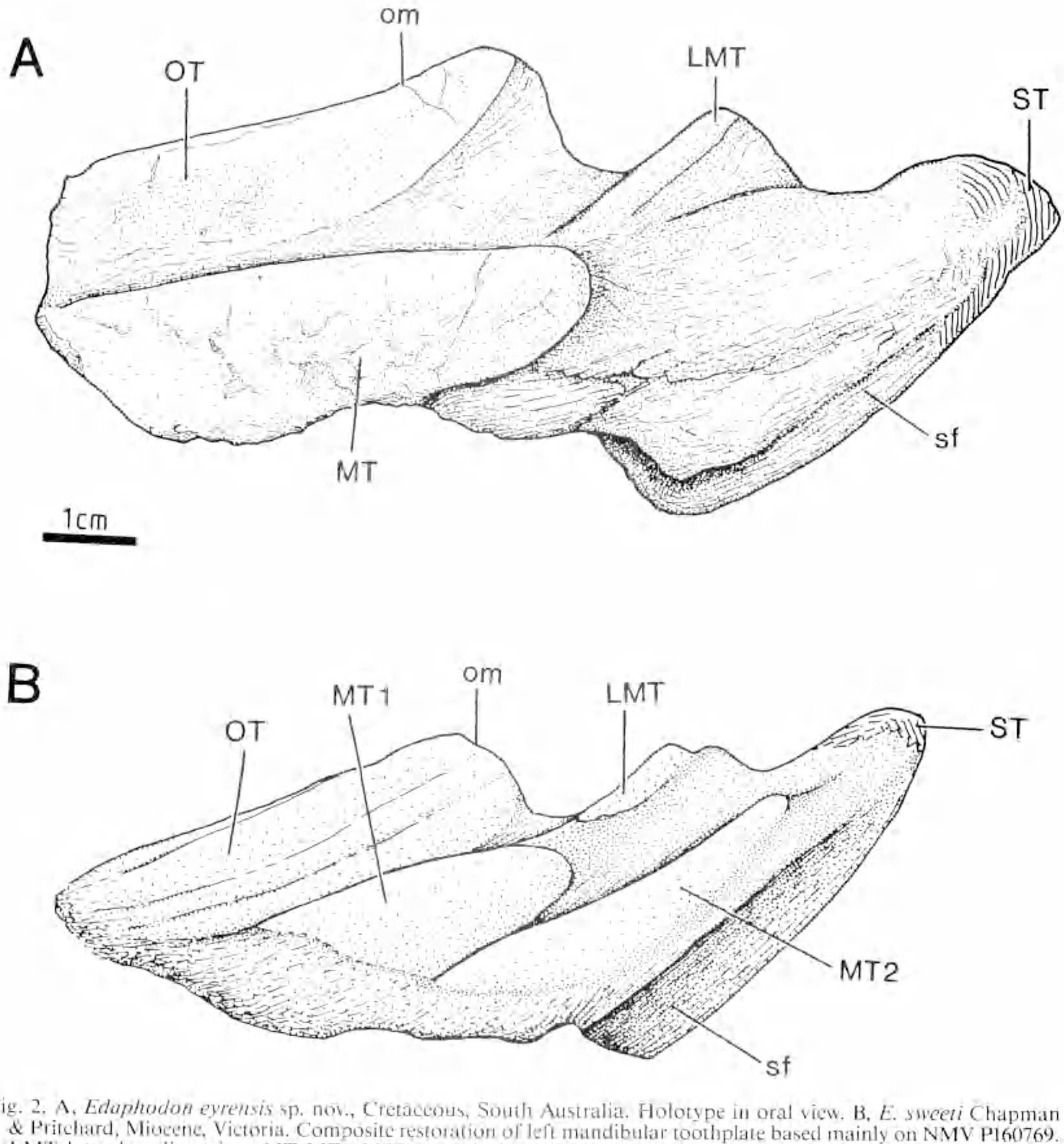

Fig. 2. A, *Edaphodon eyrensis* sp. nov., Cretaceous, South Australia. Holotype in oral view. B, *E. sweeti* Chapman & Pritchard, Miocene, Victoria. Composite restoration of left mandibular toothplate based mainly on NMV P160769. LMT, lateral median tritor; MT, MT1, MT2, mesial tritors; OM, oral margin; OT, outer tritor; sf, symphysial facet; ST, symphysial tritor.

1912, Fig. 6). This indicates that the basis for comparing the mandibular toothplates of different species relies on overall shape and the relative size and position of all the tritors. Tritors are often damaged or worn on fossil toothplates and therefore some variation in the shape of exposed tritorial surfaces is expected (Fig. 3).

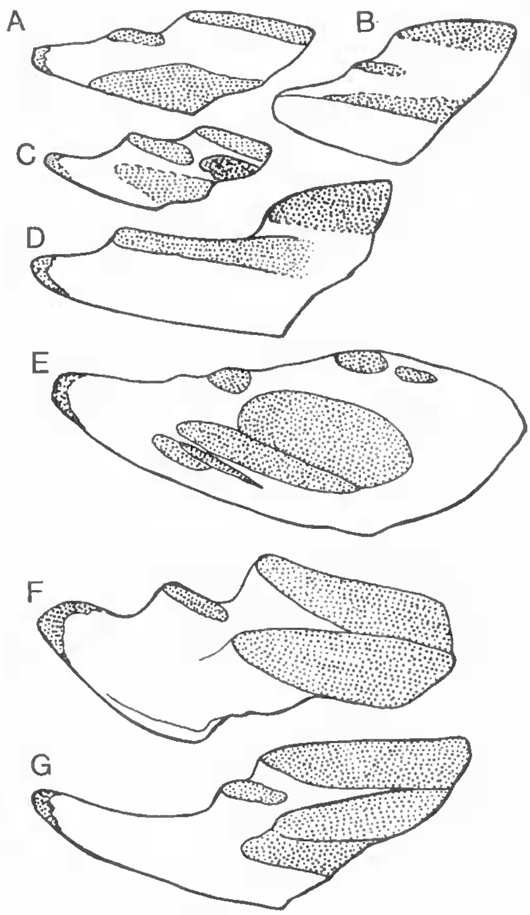

Fig. 3. Comparison of mandibular toothplates for various species of *Edaphodon*. A, *E. mirificus*; B, *E. stenobryus*; C, *E. agassizi*; D, *E. latigerus*; E, *E. bucklandi*; F, *E. eyrensis* sp. nov; G, *E. sedgwicki*. A-D, G from Hussakoff, 1912. E from Casier, 1966. Not to scale.

The other Australian species of *Edaphodon* are *E. sweeti* Chapman & Pritchard, 1907 and *E. mirabilis* Chapman & Cudmore, 1924 both from the Miocene and Pliocene of Victoria. Fig. 2 shows a comparison between *E. eyrensis* and *E. sweeti*. The mandibular toothplates of *E. sweeti* described by Chapman & Pritchard (1907) were not complete, but good material has since been found from the Pliocene Grange Burn Coquina, Victoria, and the shape of the toothplate and arrangement of tritors can be restored (NMV P160769). *E. sweeti* differs from *E. eyrensis* in having a composite outer tritor with 3–4 bony ridges dividing it; two large mesial tritors, more slender form, and proportionately longer symphysial facet. The oral margin is quite angular, as in *E. eyrensis,* but anteriorly the symphysial beak is more elongated and is concave on the aboral surface. *E. mirabilis* is known only from palatine toothplates, which have a long, slender form but are quite robust in overall structure (Chapman & Cudmore, 1924). It is unlikely that the short mandibular toothplate of *E. eyrensis* belongs with this type of palatine plate.

Edaphodon eyrensis has a broader, shorter mandibular toothplate than most species (Fig. 3), except for *E. stenobryus* Cope 1875, from the Cretaceous of North America, which has a breadth/length ratio around 0.7 (Fig. 3b). Some species from the Cretaceous of Europe and North America also have rostrally produced beaks (*E. sedgwicki* Agassiz 1843, *E. latigerus* Cope 1869; Fig. 3D, G; *E. mantelli,* Woodward, 1912). In the development of large, almost equidimensional outer and mesial tritors *E. eyrensis* resembles *E. sedgwicki* (Fig. 3G), which is the only other species older than *E. eyrensis* as it occurs in the Neocomian of England (Hussakoff, 1912). This would suggest that the simple tritorial arrangement of these two species is a primitive pattern for the genus.

Younger species have mandibular toothplates in a variety of forms with many having additional tritors present (e.g. *E. bucklandi, E. agassizi, E. sweeti*). All of the *Edaphodon* dentition types stem from the primary strengthening of the mandibular symphysis by the widening of the symphysial facet, which characterises the genus. Extreme thickening of the mandibular symphysis and robustness of the toothplates is seen in the Upper Jurassic *Pachymylus* (Woodward, 1892), a possible precursor to the line of *Edaphodon.*

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